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magnifies the labor which hundreds of readers are compelled to undergo. They are wholly neglected in the present volume.

There are certain topics in acoustics which require the use of calculus for satisfactory treatment, but of which the practical results are so important that these cannot be omitted in an elementary treatise. Such, for example, is the equation expressing the relation between velocity of propagation, elasticity and density. For propagation of longitudinal waves the method of deduction without higher mathematics, first brought out by Rankine thirty years ago, is well known. In the present text-book an independent method is employed in which the formula is briefly deduced by discussion of the displacement curve for a longitudinal disturbance. Laplace's correction is satisfactorily explained, but in the application to numerical examples the student is required to apply thermodynamic principles, with which certainly the elementary student cannot be assumed to be familiar, but which will, doubtless, be explained in the future volume on 'Heat.'

The chapter on 'Frequency and Pitch of Notes' is particularly good. In the discussion of musical quality and of concord and discord prominence is justly assigned to the masterly researches of Helmholtz, but very little attention is given to the work of Rudolph König. In like manner the work of Mayer in America fails to receive any mention. The discussion of singing flames will be found better than in most text-books, including an excellent exposition of Lord Rayleigh's investigation on this subject.

On the whole the book is much to be commended to those who are already acquainted with the principles of acoustics and who wish a modern presentation of the subject by men of high standing. For a class text-book, as commonly employed in America, it will scarcely be found well adapted.

W. LE CONTE STEVENS.

WASHINGTON AND LEE UNIVERSITY.

Photographic Optics. By R. S. COLE, M.A.
New York, D. Van Nostrand Co. 1899. Pp. 330.

The aim of this handbook, which was origi-

nally published in England by Samson Low, Marston & Co., is to give an elementary presentation of such of the problems of optics as find application in practical photography. A careful perusal of the book leaves in the reviewer's mind the impression that the emphasized word in the title should be 'optics' and not 'photographic;' that is, 'photographic' in the sense that most American amateur photographers would use the word. The book is written from the standpoint of the student of optics rather than that of the up-to-date practical photographer.

The photographer will find given in the various chapters of the book an excellent treatment of the various optical conditions encountered in using the camera, and this treatment is thorough and made as simple as the nature of the subject will admit; the author going back to first principles in all possible cases.

Perhaps the most important section is the one on lens testing, which contains an account of the tests employed at the Kew Observatory. Photographers are too apt to assign the same degree of excellence to all lenses of the same make; but the fact is that no manufacturer turns out two lenses just alike.

The photographic-lens industry is assuming such large proportions in this country that some one of our institutions ought to establish a lens-testing department which shall duplicate here the work of the Kew Observatory in England, so that when the practical photographer buys his lens he can receive with it a certificate of excellence.

We could wish that Mr. Cole had given us detailed information in regard to the construction and use of the various modern lens combinations, such as the Zeiss, Goerz and Steinheil lenses. These are points on which the ordinary amateur photographer is utterly ignorant, and even a modest amount of enlightenment would be of great benefit to him.

The author certainly dismisses too abruptly the subject of calculating the brightness of the image and timing exposures. It is not such a wholly empirical matter as is represented. Our best amateur photographers do calculate as accurately as possible the time of their exposures, and their results warrant this expendi-

ture of care and time. Still another point that should have been treated in greater detail is the use of the ortho-chromatic plate.

On such points as the last two mentioned there is a lack of practical information which will give the book less of a circulation than it should have and deserves to have on account of its many excellent qualities.

FRANK WALDO.

BOOKS RECEIVED.

Man, Past and Present. A. H. KEANE. Cambridge University Press. 1899. Pp. xii + 584.

A Short History of Free Thought; Ancient and Modern. JOHN M. ROBERTSON. London, Swan, Sonnenschein & Co., Ltd.; New York, The Macmillan Company. 1899. Pp. xii + 446.

Vital Statistics. ARTHUR NEWSHOLME. London, Swan, Sonnenschein & Co.; New York, The Macmillan Company. 1899. Pp. xii + 353.

Handbook of British, Continental and Canadian Universities, with special mention of the Courses open to Women. ISABEL MADDISON. New York, The Macmillan Company. 1899. Pp. iv + 174.

SOCIETIES AND ACADEMIES.

THE SCIENCE CLUB OF THE UNIVERSITY OF WISCONSIN.

At the meeting of the Club held on May 12th papers were read by G. C. Comstock on 'Some Recent Applications of Photography to Astronomical Discovery' and by F. H. King on 'The Flow of Liquids through Porous Media.'

Officers for the ensuing year 1899-1900 were elected as follows: President, Mr. Charles R. Van Hise; Vice-President, Mr. Edward Kremers; Secretary and Treasurer, Mr. Charles F. Burgess.

On the evening of May 6th the Club gave a



MEDAL OF THE SCIENCE CLUB OF THE UNIVERSITY OF WISCONSIN.

Every-day Butterflies: A Group of Biographies. SAMUEL HUBBARD SCUDDER. Boston and New York, Houghton, Mifflin & Company. 1899. Pp. 386.

A Selected Biography of the Anthropology and Ethnology. WILLIAM Z. RIPLEY. Boston, Trustees of the Boston Public Library. 1899. Pp. 159.

Thatsachen und Auslegungen in Bezug auf Regeneration. AUGUST WEISMANN. Jena, Gustav Fischer. 1899. Pp. 31.

Traité élémentaire du mécanisme chimique fondée sur le thermodynamique. P. DUHEM. Paris, Hermann. 1899. Pp. 381.

dinner in the Madison Guild Hall in recognition of the election of its first President, Mr. George Cary Comstock, to the National Academy of Sciences, and the awarding of a medal to its second President, Mr. Stephen Moulton Babcock, by the Legislature of the State of Wisconsin.

On June 22d the first award of the Science Club Medal will be made to that member of the senior class of the University of Wisconsin who presents the best thesis giving the results of his own original investigation of a scientific